ORIGINAL ARTICLE

IMPRESSION TECHNIQUES AND MATERIALS USED FOR FABRICATION OF EXTRACORONAL RESTORATIONS; A SURVEY

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ABSTRACT

The aim of this study was to determine the most common impression materials and techniques used for fixed restorations among dental practitioners in Karachi, Pakistan.

A cross-sectional random study with a convenient sampling technique was carried out among the practitioners over the period of 2 Months. A confidential questionnaire was designed to access details of the impression techniques, materials and trays used in fixed extra coronal restorations. The questionnaire was handed over personally to 150 dentists in Karachi out of which 100 dentists responded to it.

In this study, the response rate was 66.6%. The results showed that out of the 100 dentists 37 were general dentists, 17 were prosthodontists and 47 belonged to other specialties. The study showed that most commonly used impression technique among practitioners in Karachi was putty reline dual mix without spacer, out of the total 35.1% general dentists used this technique while 70.6% prosthodontists preferred it. The most common material used for recording impression of fixed restorations was addition silicone rubber base (53%).

For the fabrication of extra-coronal restorations, clinicians used the impression material and technique with best properties to ensure an ideal fit, longevity of restoration and patient comfort.

Key Words: *Dental Impression, Extra coronal restoration, Impression techniques, Impression materials.*

INTRODUCTION

Prosthodontics, as a specialty, has evolved greatly in past few years. Materials and technological advances keep on changing the face of dentistry every day.[1] The missing teeth can be replaced by removable partial denture, dental implant, ceramic or metal-ceramic or ceramic fixed partial dentures and resin-bonded fixed partial dentures.[2] Fixed dental restorations are usually used due to their economical, substantial durability, aesthetics, satisfactory retention and no desire for surgery.[3]

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Several impression techniques for fabrication of fixed Extracoronal restorations are available. These include the following: (1) Single copper band technique, (2) Monophase technique (in which an impression material of only one viscosity is used), (3) Single-step technique (in which impression materials of two viscosities are applied at the same time), or (4) Double-step technique (in which the impression is made in two steps, using material of different viscosity in each step).[4]

Accurate replication of tooth preparations and their arch positions require impression materials that exhibit good dimensional stability.[5] Elastic impression materials like hydrocolloid, polysulphide, condensation silicone, polyvinylsiloxane and polyether have been used for fixed partial dentures.Although alginate hydrocolloid is a popular impression material majority of dentists avoids this material due to its poor dimensional stability and unsatisfactory details.[3]

There are few elements such as tooth preparation design, soft tissue management, tray selection, impression material and techniques that influence the final impression quality.[3] Each material has its advantages and disadvantages. Impression material is selected according to patient's specific intraoral conditions.[6]

A range of impression trays including prefabricated metal or plastic stock tray is used to record a full or partial arch for fabrication of fixed partial dentures.[7]

Nowadays prefabricated dual-arch tray is most commonly used by practitioners due to its accurate record and it requires less time and material.[8]

The purpose of this study was to evaluate about an ideal impression material and technique used in fixed dental restoration amongst general dental practitioners (GDP) and specialists (SP) in Karachi.

METHODOLOGY

A cross-sectional study with convenient sampling was carried out among the dentists in Karachi. Assessment of impression material and techniques were done by constructing a questionnaire. The questionnaire comprised of seven multiple choice questions pertaining to techniques and materials used in the fabrication of fixed dental restorations. Initially, the questionnaire was referred to a group of 150 dentists of both genders in Karachi. The questionnaire was handed personally to all the dentists. All dentists were included in the study regardless of their specialization and years of clinical practice except those who were doing their housejob/ internship or had left clinical practice for over two years. SPSS software version 16 was used for data entry and results were analyzed by using Chi-square test.

RESULTS

The descriptive analysis of 100 dentists revealed a total of 41 male and 59 female participation in our study. Majority of dentists who participated were general dentist practitioners (GDP)(37%) and second highest were endodontists (26%) (Table 1). Table 2 and 3 show that commonly dentists used putty reline dual mix without spacer (2 step) impression technique for recording fixed restorations (42%) and the most common reason for this was better dimensional stability (43%).

TABLE 1: DISTRIBUTION BY SPECIALTY

Specialty	Frequency
General Practitioners	37(37%)
Prosthodontists	17(17%)
Endodontists	26(26%)
Orthodontists	10(10%)
Oral and maxillofacial surgeon	10(10%)
Total	100(100%)

TABLE 2: MOST USED IMPRESSION TECHNIQUES

Impression Technique	Frequency
Single mix	37(37%)
Dual space with spacer	17(17%)
Dual mix without spacer	26(26%)
Multiple spacers	10(10%)
Single tooth	10(10%)
Total	100(100%)

TABLE 3: REASON FOR CHOOSING IMPRESSION TECHNIQUE

Reasons	Frequency
Availability	15(15%)
Better dimensional stability	43(43%)
Easy handling	10(10%)
Better marginal accuracy	26(26%)
Cost effective	2(2%)
Less time consuming	4(4%)
Total	100(100%)

TABLE 4: IMPRESSION MATERIAL AND IMPRESSION TRAY

Impression material	Frequency	Impression tray	Frequency
Addition silicone	53(53%)	Dual arch	10(10%)
Condensation silicone	24(24%)	Complete arch	61(61%)
Polyether	5(5%)	Sectional tray	23(23%)
Polysulphide	6(6%)	Custom tray	1(1%)
Alginate	11(11%)		
Agar alginate	1(1%)		
Total	100(100%)	Total	100(100%)

The most common material used for recording impression for a fixed restoration was addition silicone (53%) and most frequently used tray used by the practitioners for making an impression after tooth preparation was complete arch tray 61% (table 4). Digital (CAD/CAM) Impression technique has never been used by the 99% of Practitioners of Karachi due to its high cost and lack of patient compliance. The data were collected anonymously, and so the results from the study could not be analyzed with regard to year or place of graduation for individual dentists.

DISCUSSION

Making an impression for oral restoration and replicating dental morphology is an integral duty of a prosthodontist, an accurate impression is undoubtedly one of the most important stages in fixed restoration fabrication. Ignoring this treatment stage will result in inaccuracy and consequently a restoration with improper adaptation. Lack of accuracy in impression making also leads to repeated impression making, which is costly and time-consuming for the patient and clinician himself. Thus selecting the best and most accurate dental impression material and techniques

seems to be necessary for a successful treatment.[9]

In the present study, the most widely used impression technique was found to be putty reline/dual mix technique without a spacer (42%). The main reason for this choice is Dual mix impressions have some significant advantages over conventional full arch impression techniques. These include the use of only one tray, which captures an impression of the prepared tooth, the adjacent and opposing teeth, and the relationship between them in maximal intercuspation without the need for an interocclusal record.[7]

The most commonly used impression material among dental practitioners was found to be addition silicone as it is the impression material least affected by pouring delays or by second pours.[10] Putty and light body wash consistencies could also be made of this type of silicone. The biggest disadvantage of addition silicone or PVS is a retardation of the setting process by latex gloves.[11] In spite of the proven results that elastomeric impression materials are better than alginate and agar for making an impression but due to the higher cost of elastomeric impression materials 11% of clinicians were still using alginate material.

Digital Or CAD/CAM technology has evolved greatly over the past few years and shows various advantages over conventional impression techniques.Digital impressions offer speed, efficiency, the ability to store captured information indefinitely and transferring digital images between the dental office and the laboratory.The advantages of the digital impressions and scanning systems are improving patient acceptance, reducing the distortion of impression materials, 3D pre-visualization of tooth preparations, and potential cost- and time-effectiveness.[12] But unfortunately, in Pakistan, this technology is not prevalent due to its high cost, technique sensitivity and decreased patient compliance and awareness. The limitations of this study were small sample size and no equal distribution of specialization was maintained hence the impression techniques and materials used by the practitioners show a variable response.

CONCLUSION

The long-term success of fixed dental restorations requires the amalgamation of accurate usage of impression tray, impression material and impression technique. If ideal impression technique is not followed for fabrication of fixed restorations it may lead to compromised fit and eventually failure of the prosthesis. Hence more research should be carried out to evaluate the long-term success of various impression materials, techniques and educational activities should be carried out to ensure that majority of dental practitioners regardless of their specialization use the correct impression technique and ideal material for fabrication of the fixed dental restorations.

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